MISSISSIPPI

ARCHITECTURE & TECHNOLOGY DELIVERY PLAN

2020 | 2022

Mississippi Department of
Information Technology Services

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Introduction

STRATEGIC OBJECTIVES

Each year the Mississippi Department of Information Technology Services (ITS) publishes the *Mississippi Statewide Architecture and Technology Delivery Plan* to inform the Governor and the Legislature, the ITS Board, state agencies and institutions, information technology (IT) vendors, and the public about ongoing and planned statewide technology initiatives impacting state government.

This Plan references details pertaining to the core architecture domains of the statewide infrastructure and the IT projects planned for each domain. ITS leverages internal research capabilities and vendor relationships to keep pace with evolving infrastructure technologies, incorporating these technologies into strategic plans and projects when advantageous to the State. Of equal importance, ITS assesses changes in infrastructure requirements and technology through interactive agency and institution planning processes, emerging technology initiatives, and participation in and tracking of infrastructure projects.

An online version of the *Mississippi Statewide Architecture and Technology Delivery Plan* can be viewed by visiting the ITS website at www.its.ms.gov.

SCOPE

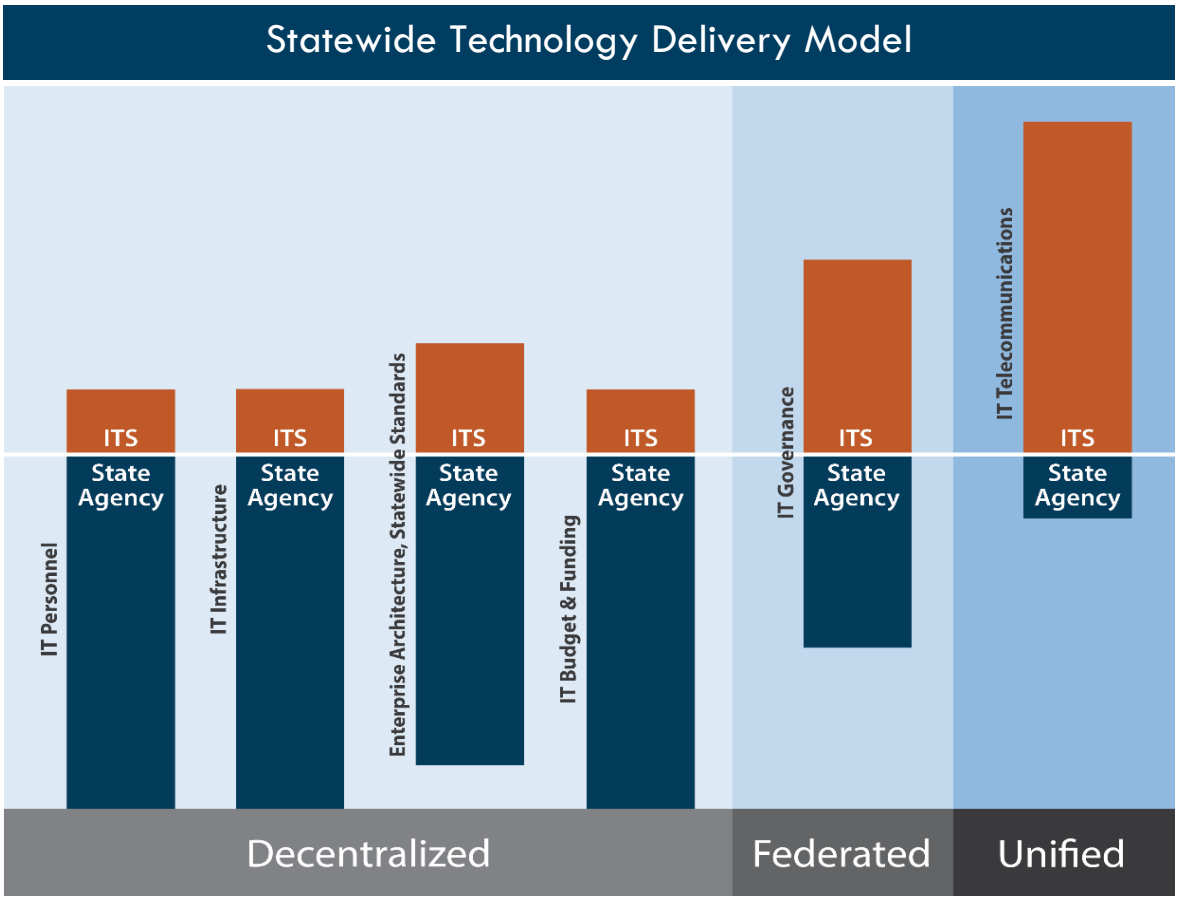
The mission of ITS is to provide trusted technology resources and services that offer proven value to all stakeholders in Mississippi government. The rapid evolution and expansive growth of data, voice, and video technologies provide a continuous challenge to seamless integration of technology resources and services that are customer-centric, scalable, secure, efficient, and effective.

In this diverse technical ecosystem, the Legislature has tasked ITS with providing statewide services that facilitate cost-effective information technology and telecommunication solutions that can be shared with all state agencies. In addition, ITS, with the full cooperation of the state agencies, strives to identify opportunities to minimize duplication, reduce costs, and improve the efficiency of providing common technology services across state agency boundaries.

ITS
is committed

to ensuring that the State of Mississippi receives the maximum use and benefit from information technology and services and to assisting agencies as they strive to reduce costs by capitalizing on shared technology.

As depicted below, the model of the Mississippi statewide architecture has domains that are decentralized, federated, and unified. It is the intent of this Plan to highlight communication and computing technologies, web-based computing applications, networking technologies, management tools, strategic planning, and human resource tools that provide state agencies with the essential tools to accomplish their missions. Through the optimization of information technologies and telecommunication networks, state government in Mississippi is arching toward a cooperative statewide enterprise, built upon a common architecture.



For the purpose of this Plan, the "statewide architecture and technology infrastructure" is defined as "those architecture domains that, through connectivity, offer the potential for state entities to communicate with each other using voice, video, and data." To that end, certain local infrastructure components located within state agencies are not considered a part of the statewide architecture and infrastructure but are considered local technology infrastructure for a particular building, agency, institution, or campus.

Plan Overview

STATEWIDE ARCHITECTURE PRINCIPLES

The statewide architecture principles are shared, long-lasting beliefs that hold true across the statewide shared technology infrastructure. The following principles provide a rationale for adherence, serves as starting points for difficult evaluations and decisions, and guides the design and selection of technology components.

PRINCIPLE	RATIONALE
Business Drives IT	• Align and optimize IT resources with changing needs of state entities and local governing authorities • Enable the effective implementation of state business strategies • Highlight and promote the value of IT to executives and policy makers
Enterprise Focus	• Reduce implementation and support costs through a consistent enterprise-wide approach to IT solutions • Consolidate or integrate existing systems and technical infrastructure • Provide the IT foundation to support the business processes of state entities and local governing authorities
Common Solutions	• Share and re-use IT assets • Ensure interoperability by eliminating technology silos
Secure Data	• Reduce the security risks of the State's IT infrastructure and data • Increase support for funding a functional, secure, and reliable infrastructure • Improve deliver, efficiency, and accessibility of government services to the public
Align Compliance Standards	• Support the statewide IT vision • Align with national compliance standards • Increase the consistency, accessibility, and sharing of data and applications
Continuous Progress	• Ensure IT efforts support the State's evolving business needs • Leverage the advantages of new technologies while balancing investments in existing systems • Respond to agency changes in technology and business requirements
Reduce Technical Diversity	• Reduce costs by eliminating redundant investments in technology • Increase the consistency, accessibility, and sharing of data
Business Continuity	• Support the high-availability required for state and local governing authority missions • Ensure a stable, long term, and viable technology environment • Improve recoverability of critical government services after a disaster

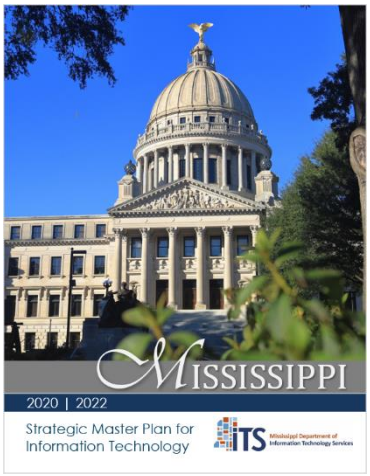
An enterprise as diverse as the State can benefit from a set of shared foundational beliefs. Without architectural principles, IT management decisions are guided by varied preferences or assumptions, often resulting in both ineffective and inefficient technology investments.

COMPLIMENTARY PUBLICATIONS

Each year, ITS publishes the *Mississippi Strategic Master Plan for Information Technology* and the *Mississippi Statewide Architecture and Technology Delivery Plan*. Both documents are widely utilized to gain a clear overview of technology plans and programs affecting state government.

The *Strategic Master Plan* documents high-level technology initiatives in rolling three-year increments by establishing a common set of focused statewide strategies and goals for the State's information technology (IT) enterprise. The *Statewide Architecture and Technology Delivery Plan* provides similar, but more detailed information from a technology infrastructure and delivery perspective. These expansive enterprise plans in no way supplant the business-oriented plans of individual state agencies. As companion planning documents, the *Strategic Master Plan* and the *Statewide Architecture and Technology Delivery Plan* assist agencies in aligning their use of technology with the direction established for the State's IT enterprise. Technologies highlighted in this plan are intended for use by all state agencies regardless of their mission or complexity.

The shared infrastructure components implemented by ITS and outlined in the *Mississippi Statewide Architecture and Technology Delivery Plan* provide direct support for the goals and strategies presented in the *Mississippi Strategic Master Plan for Information Technology*.



As companion planning documents, the *Strategic Master Plan* and the *Statewide Architecture and Technology Delivery Plan* assist agencies in ALIGNING their use of TECHNOLOGY with the DIRECTION established for the State's IT enterprise.

STRATEGIC MASTER PLAN GOALS AND STRATEGIES

GOAL 1

Provide, Protect, and Support Enterprise Technology Infrastructure Components to Enable the Effective and Efficient Use of Information Technology

STRATEGIES

- Utilize fully the Primary and Ancillary Data Centers' Technology Infrastructure Services
- Provide, manage, and facilitate efficient and cost-effective usage of telecommunications services
- Provide, protect, and support enterprise technology infrastructure components to strengthen the security posture of the State

Investigate, Develop, and Promote Enterprise Business and Technology Solutions to Maximize the Benefits of Shared Services

STRATEGIES

- Implement and promote digital government and mobile solutions to deliver public sector services
- Implement an effective and efficient messaging service for state government
- Investigate, propose, and implement an effective and efficient enterprise disaster recovery service
- Investigate, propose, and implement an effective and efficient enterprise cloud solution for state government

Promote the Funding, Procurement, and Management of Information Technology as a Strategic Investment

STRATEGIES

- Initiate innovative and collaborative procurement strategies and practices
- Raise awareness and seek alignment of the IT investment process
- Enhance contract management strategies and practices
- Provide innovative and timely information technology training to state employees

Promote Statewide Sharing of Information Technology Between all State Agencies to Foster a Collaborative Approach to the Innovative and Digital Transformation of Government

STRATEGIES

- Develop a technology blueprint that drives improved IT coordination and investment
- Facilitate and coordinate inclusive planning and outreach processes across state government
- Continue emerging technology research and strategic private sector relationships
- Provide effective communications via media-related activities to improve communication with all partner agencies, advance the ITS's mission and vision, and encourage public interaction

IT STRATEGIC GOALS MAPPED TO ARCHITECTURE PRINCIPLES

The following table shows the relationship between the State's IT strategic goals established in the *Mississippi Strategic Master Plan for Information Technology* and the statewide architecture principles.

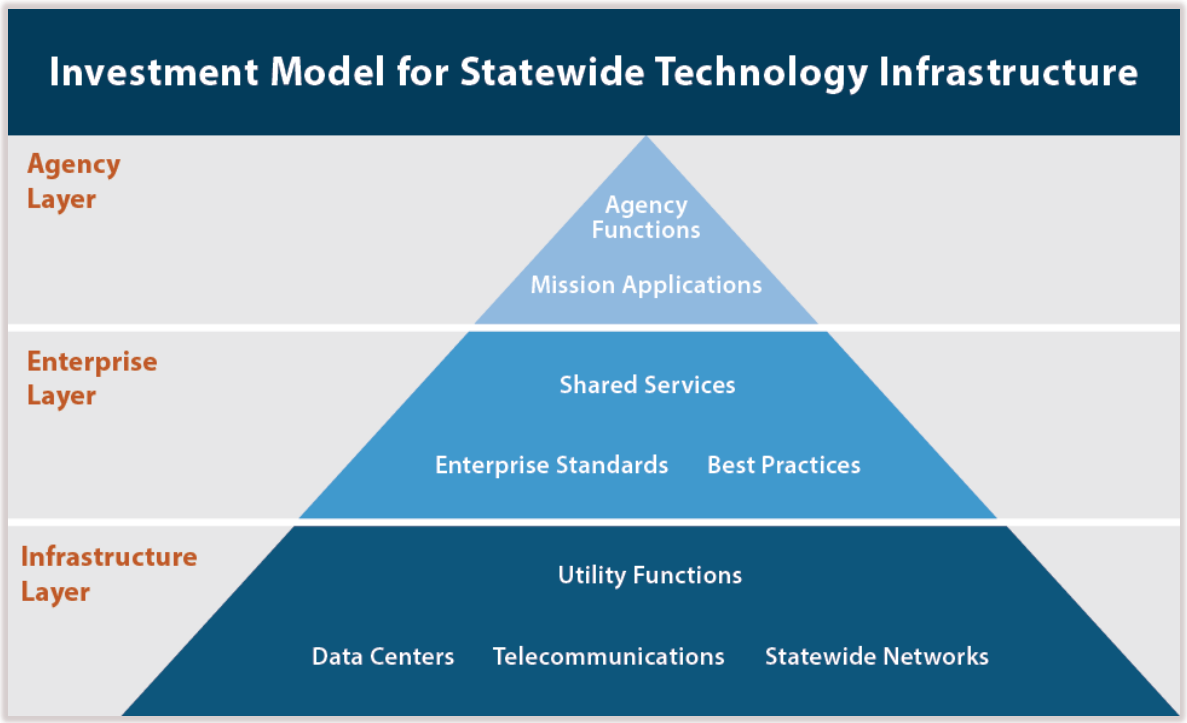
Statewide IT Strategic Goals	Related Statewide Architecture Principles
Provide, protect, and support enterprise technology infrastructure components to enable the effective and efficient use of information technology	➢ Secure Data ➢ Business Continuity
Investigate, develop, and promote enterprise business and technology solutions to maximize the benefits of shared services	➢ Business Drives Information Technology ➢ Common Solutions
Promote the funding, procurement, and management of information technology as a strategic investment	➢ Enterprise Focus ➢ Continuous Progress
Promote statewide sharing of information technology between all state agencies to foster a collaborative approach to the innovative and digital transformation of government	➢ Align Compliance Standards ➢ Reduce Technical Diversity

Shared Technology Infrastructure Investment

INVESTMENT MODEL FOR STATEWIDE INFRASTRUCTURE

To ensure the effective and efficient use of public funds, ITS collaborates across state and local government agencies to effectively manage and deliver statewide IT services and technologies that are beneficial, secure, accessible, and that leverage the statewide shared infrastructure and architecture.

The Investment Model is comprised of three layers:



- **The Infrastructure Layer** includes managed service delivery, which encompasses State Data Center services, telecommunications and networking services, and shared computing resources.
- **The Enterprise Layer** represents the areas where ITS and agencies work together to leverage Mississippi's technology investment. Another aspect of the Enterprise Layer is to ensure that effective and innovative solutions are identified and broadly communicated as

best practices across the enterprise. Partnerships are an essential element of the Enterprise Layer as Mississippi government seeks to fully leverage the shared services and technology infrastructure.

- **The Agency Layer** represents the agencies' business lines. It encourages creative approaches and supports an innovation-centered environment where individual agencies have the time and resources to focus on creative business solutions.

By utilizing the shared services depicted in the bottom layer of the model and by leveraging the statewide enterprise policies, best practices, standards, partnerships, and blueprints reflected in the middle layer, individual agencies are able to innovate with creative solutions that focus on fulfillment of their agency's core missions while taking advantage of the enterprise statewide technology architecture. Deployment of innovative technology solutions will expand access to information and services, equip employees with the tools needed to accomplish their jobs, and improve decision making within organizations.

FUNDING THE SHARED TECHNOLOGY INFRASTRUCTURE

The National Association of State Chief Information Officers (NASCIO) and the National Governors Association (NGA) strongly emphasize the need for a strategic IT investment process which ensures that state agencies utilize innovative, smart-buying, investment techniques. With IT becoming a critical component of state government infrastructure, many states have focused on using IT to solve problems in government operations. Currently, the budgeting and funding of IT within Mississippi state government is accomplished on an agency-by-agency basis.

Many opportunities exist that the State can leverage to accomplish an increasingly strategic investment of IT resources, including strategically planning for upgrades, transferring cost savings to fund applications, and implementing return-on-investment programs. Industry best practices suggest that in order to achieve maximum efficiency, IT commonality should be increased and similar IT resources should be shared between all agencies, divisions, and departments of the larger enterprise. In order to achieve this enterprise view and strategic investment of state IT resources, full collaboration is needed between state agencies and ITS.

For state government to be as responsive and cost-effective as possible, it is essential to have a clear view of statewide goals and how to achieve them. Technology will have the greatest impact on the State if implemented in a way that fosters sharing and collaboration between all state agencies. ITS seeks to be an enabler of goals set by state agencies through the use of technology. When technology is implemented at the statewide layer, it can be shared and utilized by all state agencies.

FUNDING TELECOMMUNICATIONS VIA UNIVERSAL SERVICE

The Communications Act of 1934 stated that all people in the United States should have access to "rapid, efficient, nationwide communications service with adequate facilities at reasonable charges." In the Telecommunications Act of 1996, Congress further refined this goal, decreeing that it is federal policy to provide support for services "essential to education, public health, or public safety" and that all people, regardless of location or income level, should continue to have affordable access to telecommunications and information services. This concept, as defined here, has come to be known as Universal Service.

The support mechanisms necessary to achieve universal service are administered by the Universal Service Administrative Company (USAC), www.usac.org, an independent, not-for-profit organization regulated by the Federal Communications Commission (FCC), www.fcc.gov. USAC provides universal service support through these four programs:

1. **High Cost**
   Supports telephone companies that serve high-cost areas
2. **Lifeline**
   Assists low-income customers by helping to pay for monthly telephone charges as well as connection charges
3. **Rural Health Care**
   Allows rural health care providers to pay rates for telecommunications services similar to those of their urban counterparts
4. **Schools and Libraries**
   Popularly known as "E-Rate," provides discounted Internet access, internal connections, and telecommunications services to schools and libraries

Schools and Libraries (E-Rate)

During the past 22 years of the E-Rate program, schools and libraries in Mississippi have received over $732 million dollars in credits.

*Discount committed to the State of Mississippi applicants for 2019 is $27,710,842**

Source: http://www.e-ratecentral.com/us/stateInformation.asp?state=MS
**Some funding requests remain under review.*

Schools and Libraries (E-Rate)

The Schools and Libraries Program www.usac.org/sl was established by Congress to help make advanced telecommunications affordable for the nation's K-12 schools and libraries. It provides discounts ranging from 20% to 90% on the costs of eligible telecommunications services, Internet access, and internal connections. Based on the percentage of students within the district eligible for the National School Lunch Program, the highest discounts go to the schools and libraries serving the most disadvantaged populations.

During the past 22 years of the E-Rate program, schools and libraries in Mississippi have received over $732 million dollars in credits. ITS fills several roles related to E-Rate:

- **Master Contracts** - ITS posts Form 470s and issues Request for Proposals (RFPs) to establish E-Rate eligible master contracts from which schools and libraries can receive E-Rate eligible services. Examples of these services are Wide Area Networking Circuits, Internet Access, Voice Services, and Cellular Service.
- **State Level Coordination** – ITS works with the Mississippi Department of Education, the Mississippi Library Commission, and service providers throughout the E-Rate process. Through this coordinated effort, the State of Mississippi has maintained a 100% participation rate of public school districts and a 99% participation rate of public libraries in the E-Rate program.
- **National Responsibility** - Through affiliations with the National Association of State Chief Information Officers, and National Association of State Technology Directors, and the State E-Rate Coordinators Alliance, ITS is very involved at the national level in efforts to continually improve the program. ITS routinely works with the Federal Communications Commission, the Schools and Libraries Division of USAC, and has been called upon to testify before congressional hearings that deal with issues related to the E-Rate program.

Collaborative Initiatives

Building on the investment model for enterprise infrastructure, specific initiatives are implemented at the enterprise layer when the resulting solution provides services to the agency layer, benefiting the entire State. ITS has focused on advancing four statewide initiatives that include:

- ⇒ Cybersecurity
- ⇒ Network and Communications
- ⇒ Cloud Computing
- ⇒ Strategic Data Management

CYBERSECURITY

Today's evolving and dynamic threat environment demands state government focus on cybersecurity. Cybersecurity has continued to rise in importance in the eyes of elected leaders across the country, with this executive-level attention proving to be an opportunity to secure resources and support for state cybersecurity programs.

Given its current trajectory, cybersecurity risk in state governments will continue to increase as a result of innovation and the use of technology and data. As are many state governments, Mississippi is continually implementing new technology solutions in order to reduce costs, increase productivity, and provide critical services to citizens.

Unauthorized disclosure, theft, loss, destruction, or alteration of information could disrupt the financial stability of state government, deteriorate user confidence, and limit the State's ability to continue to provide mission-critical services. The protection and privacy of information assets must be a priority for all state government operations to ensure the confidentiality, integrity, and availability of mission-critical services to the employees and citizens of Mississippi.

In 2017, the Mississippi Legislature realized the benefits of statewide cybersecurity and enacted legislation to formally establish the Enterprise Security Program. HB 999 enables the oversight of the cybersecurity efforts across all state agencies, including cybersecurity, services, and the development of cybersecurity policies, standards, guidelines. ITS is committed to the full, collaborative implementation of the Enterprise Security Program, with a focus on improving the State's cybersecurity posture, integrating security into the business operations of the Enterprise State Network and State Data Centers, operating solutions to reduce the cybersecurity risk every agency faces, and overseeing the enterprise-wide cybersecurity effort.

NETWORK AND COMMUNICATIONS

For over a quarter-century, every level of government in Mississippi has worked together on the planning, development, and implementation of the Statewide Telecommunications Network through the cooperation of a consortium. Today, this network facilitates a secure, redundant, high-performance architecture that is utilized by state government, universities, libraries, community colleges, K-12 schools, and local governing authorities, with over 2,700 end sites, and 99.99% Internet availability.

A foundation element in the growth and stability of the network has been the establishment of a consortium model where agencies and institutions have collaborated to procure common transport technologies, through shared specifications, terms, and solutions.

A foundational element in the growth and stability of the Network has been the establishment of a consortium model where agencies and institutions have collaborated to procure common transport technologies, through shared specifications, terms, and solutions. The consortium approach in the procurement and operation of the Statewide Network has utilized common technology equipment and services to drive down maintenance expenses, delivered high quality and affordable technology solutions throughout the State. It has provided the potential of further volume discounts as other entities opted to participate in the consortium which improved accountability and reporting to the Legislature on the use of enterprise technologies and reduced the expense of duplicative technology services, contracts, and management.

As technology continues to evolve and paradigms shift, diverse sets of strategies and solutions must be considered in making the government more efficient and effective. ITS provides statewide services that facilitate cost-effective information processing, as well as minimize duplication while providing common technology services across agency boundaries. In accordance with MS Code § 25-53-5(f) and § 25-53-109(a), ITS formed a technical advisory committee, the Statewide Network Advisory Council.

The Council is a diverse cohort, comprised of government and education stakeholders critical to the success of the Statewide Network. The principal focus of the Statewide Network Advisory Council has been the investigation of emerging technologies, as well as the collaborative development of technical specifications for the next-generation statewide telecommunications network. The Council's work led to the development of a comprehensive list of technical specifications that allowed the State to modernize its legacy infrastructure. Currently, the State is in transition to a new statewide telecommunications contract and service provider with a robust portfolio of enhanced services and features. The new contract provides the State the opportunity to transition to a fully integrated Internet Protocol (IP) network utilizing fiber-based facilities. The collaborative work of the Council ensures that Mississippi government and education entities remain competitive and at the forefront of the global market. This allows for the continued establishment of a standards-based, enterprise solution that minimizes operational costs for all parties by leveraging the volume buying power of the State.

CLOUD COMPUTING ECOSYSTEM

As technology delivery models continue to transform, public sector CIOs are often challenged with reaching an equilibrium between innovation and reality. At that intersection is a diverse set of strategies and solutions full of possibility that, when implemented, would make the government more efficient and effective. In the IT ecosystem today, cloud computing represents that new reality – hyper-scalability and flexibility.

Cloud, in its various derivations, embodies much of the debate often entertained in the public sector; that is, how to maximize shared investment in technology in order to deliver a significant return on investment and lower the cost of service delivery. One of the potential benefits of cloud lies in its near-infinite scalability. Cloud is presumed to minimize, or potentially eliminate, the need to make capital investments in technology infrastructure. The elimination of upfront capital investments with cloud is a formidable argument, especially in the public sector.

Many governments have implemented a "cloud first" policy, pushing most workloads to third-party hosted infrastructure. While a one-size-fits-all approach is unwise, appropriately moving to cloud services allows agencies to pool shared services and infrastructure that supports rapid provisioning, flexibility and scalability, and measured service. This transition is disruptive to the traditional aspects of state IT, with a large impact seen in the budgeting process, as funding shifts in cost allocation from capital expenditure (CapEx) to operating expenditure (OpEx).

To foster a dialogue on cloud implementation strategies, ITS formed a technical advisory committee, the Statewide Cloud Advisory Council, in accordance with MS Code § 25-53-5(f) and § 25-53-109(a). The Cloud Council began work in 2016 to define the strategy, direction, framework, and future policy for cloud services in Mississippi state government. With the Cloud Council formation, the State has sought a collaborative approach, fostering an inclusive relationship with each agency participating, defining technical and functional requirements, and establishing a standards-based enterprise solution. The work of the Cloud Council resulted in the current development of the Mississippi Cloud Ecosystem with the awards of RFP 3847 for the Ancillary Data Center and RFP 3963 for the Hybrid Cloud Solution to provide colocation, managed on-premise cloud, and public cloud options for agency consideration.

STRATEGIC DATA MANAGEMENT

The rapid, exponential growth of data in the public sector, with scant analytical tools or skills, challenges governments to identify and solve real-world, and often-intractable policy problems. Public entities are often surrounded by data that is unused or unsuited for analysis. The vital importance of information sharing, data governance, and predictive analytics is regularly highlighted, as in the recently published *Top Ten Priorities for 2020* by the National Association for State Chief Information Officers (NASCIO), which cited Data Management and Analytics as eighth on the list, after joining the "Top Ten" from NASCIO for the first time in 2015.

NASCIO noted in the 2015 publication, *Data the Lifeblood of State Government*, 35% of state governments self-reported the pursuit of big data initiatives. Also of importance in the NASCIO report is the recognition that explosive growth in the creation of data has direct ties to the rise of the Internet of Things (IoT) and unmanned aerial systems (UAS). Yet, given that many states have

established big data initiatives, the resistance to information sharing can create intractable inertia. In a follow-up 2016 report, *Better Decisions, Better Government: Effective Data Management through a Coordinated Approach*, NASCIO describes opposition to early adoption often slows or stalls the progress of big data initiatives.

Acknowledging the difficulty that comes with sharing information in a cross-jurisdictional context, the Mississippi Legislature passed HB 649 during the 2017 Regular Legislative Session creating the Data Management Working Group. HB 649 enabled the State to examine data as an enterprise asset. The Data Management Working Group was tasked with researching state agency data sources on issues related to quality, utility, and accessibility, across all branches of Mississippi state government. The findings of the research, as well as recommendations, were reported to the Legislature on December 1, 2019.

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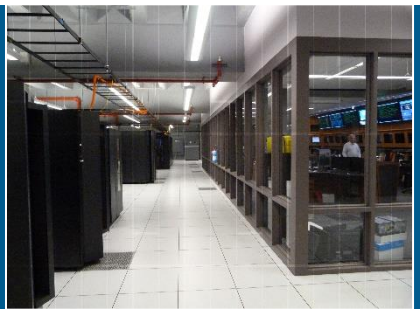


Platform Domain

PRIMARY DATA CENTER

Description

The State of Mississippi Data Centers consist of two enterprise physical facilities that together deliver highly available and secure virtual server and storage solutions to state government entities. Both facilities are joined together by diversely routed high-speed fiber networking. The Primary Data Center (PDC) is the principal facility for hosting mission-critical information systems and applications for the State. The PDC is comprised of over 12,000 square feet of raised floor area, with failsafe features, environmental controls, and robust technology to support these applications within a hardened, resilient, and secure environment. The Ancillary Data Center (ADC) is a top tier data center located in Starkville, Mississippi providing the State with a geographic diverse hosting solution through a public-private partnership with a Mississippi company. Together, the PDC and ADC deliver a robust, flexible, secure, and cost-effective solution that support colocation and virtual application environments to meet the information technology needs of the State.

The Primary Data Center contains:

- Core routers and switches supporting the State's Wide Area Network (WAN) and Metro Area Network (MAN)
- Virtualized server platforms for industry-standard operating systems
- INTEL server platforms
- Email relays and filtering

Physical Facilities Attributes

Included in the PDC are the following features that contribute to a secure and highly available physical environment:

- Designed to withstand an EF4 Tornado (approximately 200 MPH)
- Two diversely routed power feeds engineered for automatic failover
- Two 1.5 Megawatt generators providing support for 10 days, dual-fueled for diesel and natural gas

- Two diesel tanks holding 18,000 gallons of fuel
- Four 3-ton chillers for environmental control
- One 40,000 gallon in-ground water tank to support chillers
- In-house living facilities to support critical operations
- Environmental systems are monitored 24x365
- Card and biometric secure access controls
- Intelligent fire alarm and suppression system
- Intelligent water detection and notification system
- 24x365 operations support including armed security guards and operations staff on-site with technical engineers on-call

Proposed Projects

- Extend the enterprise hybrid cloud platform to include access to the public cloud
- Promote the enterprise hybrid cloud platform to local governments and governing authorities
- Develop a coprocessing integration strategy by leveraging the attributes of the PDC and the ADC into a seamless networked solution
- Develop statewide governance for cloud computing services for both public and private cloud

Benefits to the State

Agencies utilizing the PDC to house IT equipment and deliver mission-critical applications benefit from the following features:

- Secure physical environment monitored and staffed 24x365
- Dedicated building engineering services to coordinate maintenance and repair of electrical power, A/C, plumbing, generators, UPS, and cabling
- Fully redundant power source
- Alternate water supply
- Environmentally controlled space
- Fully equipped fire suppression system with fire and water alarms
- Highly protective environment for critical State technology assets

ANCILLARY DATA CENTER

Description

In response to the complexities of state government information technology applications and the needs of many agencies requiring advanced backup and recovery options, ITS has expanded the State's PDC through a public-private business partnership for supplementary data center services and complementary cloud services creating the ADC. In December 2016, ITS entered into a strategic long-term agreement with a Mississippi-based diversified telecommunications and technology services company as a business partner to provide a portfolio of data center colocation and accompanying cloud-based IT solutions available to state and local agencies.

This statewide agreement gives public entities access to a broad range of services available through Mississippi's newest, purpose-built and Uptime Institute certified Tier 3 commercial data center. The ADC is located on a 6.5-acre site at the Thad Cochran Research, Technology, and Economic Development Park in Starkville, MS providing geographic diversity from the PDC in Jackson, Mississippi. The many options that are offered such as improved disaster recovery, business continuity, high availability, and faster recovery timeframes capabilities provide increased protection of the State's electronic information.

Connectivity between the PDC and the ADC allows the State to transition services from the legacy coprocessing location to a geographically diverse facility designed specifically for data processing and high availability. By fully leveraging the two high-end data center facilities, the State is able to manage the IT environments in the most flexible, high-performing, and cost-effective manner using the latest globally proven technology. The public-private partnership enables a true hybrid cloud service across internal and external state government environments. To best serve state agencies and other local government entities, technical architecture for network connectivity and data processing capabilities guide the use of the ADC to compliment services currently running in the PDC.

By fully leveraging the two high-end data center facilities, the State is able to manage the IT environments in the most **flexible**, **high-performing**, and **cost-effective** manner using the latest globally proven technology.

Services Provided

- IT colocation and virtual cloud services
- Proactive monitoring with 24x365 operations and on-call technical support at both State Data Center locations
- Enhanced backup and recovery options utilizing the latest technology solutions
- Increased resiliency and accessibility with high availability options

Proposed Projects

- Develop a statewide architecture and policy for the effective use of the ADC
- Increase the high-speed, redundant network capacity between the PDC and Capitol Complex fiber network to the ADC
- Relocate replicated storage located in the Capitol Complex to the ADC to achieve greater geographic diversity
- Integrate core networking capabilities into the ADC for all partner agencies utilizing services offered by the public-private partnership
- Optimize the use of the ADC to include core network and security equipment as well as an alternate path for Internet access

Benefits to the State

- Establishes a geographically diverse computing environment for developing a high availability solution for mission-critical state government applications
- Leverages the PDC resources by partnering with a top tier data center company to extend the State's IT capabilities
- Allows the State to purchase services as needed, eliminating the need for large capital expenditures
- Maximizes utilization of resources with shared infrastructure

MAINFRAME AS A SERVICE

Description

Since 1970 ITS has provided state government agencies with a shared mainframe solution in support of the State's mission-critical applications. Over the past seven years, many agencies have modernized these applications to operate within a virtual Windows or Linux environment in either the enterprise hosted solution or the colocation area. The decrease in applications operating on the mainframe has increased the cost per share; thus, making this service too expensive to justify. As an alternative to operating a mainframe environment as a capital expense, ITS is investigating a service-based solution for any future mainframe needs. This new approach will become an operational expense where services are consumed and billed monthly on a usage basis.

Proposed Projects

- Evaluate options for the State to procure a Mainframe as a Service (MFaaS) solution in support of any existing and future mainframe needs
- Promote the use of an MFaaS contract for agencies requiring this type of service

Benefits to the State

- Changes the State's delivery approach from a CapEx to OpEx model based on agency consumption
- Offers a scalable, stable, and highly secure environment for application systems
- Provides shared systems that produce long-term savings with economies of scale
- Offers an environment that supports both legacy applications and more recent e-Business applications, permitting integration on the same platform
- Provides improved backup and recovery procedures
- Improves disaster recovery test procedures for mainframe customers
- Provides a mature development environment
- Establishes a 24x365 operation with after-hours on-call technical support

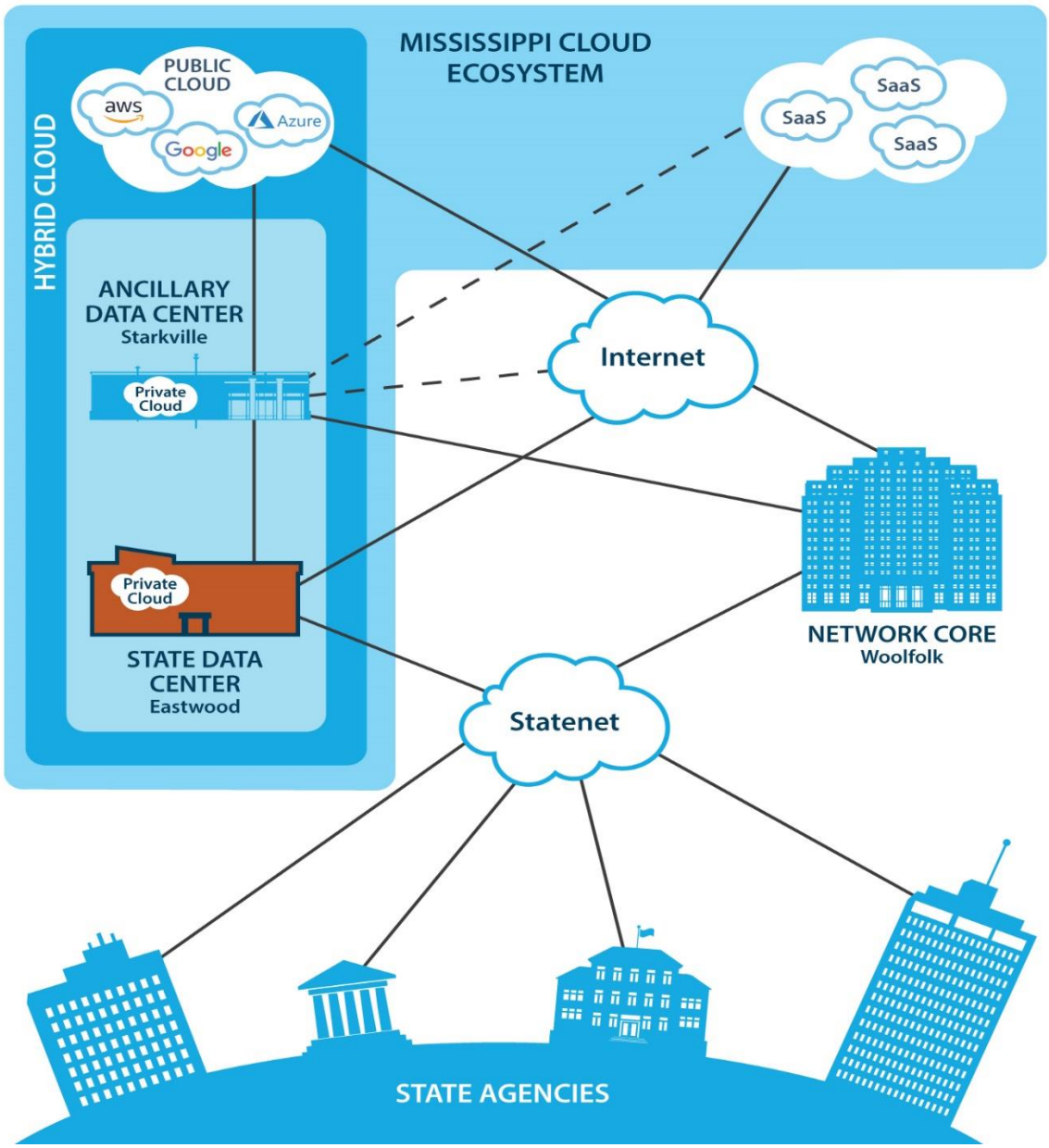
CLOUD COMPUTING ECOSYSTEM

Description

IT landscapes have changed dramatically over the past decade shifting from a customer-owned, on-premise computing environment to a tiered architecture giving businesses and governments options for supporting and running their unique applications. This change has allowed for the redistribution of funds from a CapEx model to an OpEx model, eliminating the need for large scale purchases and maintenance of IT equipment. Additionally, the move to an OpEx model has improved business resiliency and the overall delivery of services through available cloud technologies. Adopting a "cloud-right" strategy consisting of cohesive platforms and services affords subscribers with an ecosystem suitable for selecting a cost-effective, secure, and resilient infrastructure that can seamlessly transition workloads from one environment to another.

In 2019, ITS initiated the buildout of the Mississippi Cloud Ecosystem for state government consisting of the following:

- An enterprise on-premise, private cloud solution housed in the State's PDC
- Mirrored infrastructure housed in the State's ADC
- Secure public cloud access for improved or additional business resiliency, backup, and recovery capabilities
- Management software allowing seamless transitions of workloads between tiers within the Ecosystem



Proposed Projects

- Transform the existing state-owned virtual infrastructure into an innovative hybrid cloud ecosystem solution
- Work with partner agencies to optimize their applications for efficiencies and cost savings
- Expand application load balancing and proxy services
- Work with partner agencies to implement effective business resiliency to meet performance and recovery objectives

Benefits to the State

- Allows for an OpEx model for all consumed computing services
- Provides reduction in equipment purchases and required maintenance expenses
- Establishes new architecture with options to improve business resiliency and business continuity based on business requirements
- Enables flexible and expandable architecture to other cloud platforms to meet capacity needs

PRIMARY DATA CENTER COLOCATION ENVIRONMENT

Description

The State's Primary Data Center (PDC) offers agency partners a physically secure and environmentally controlled colocation environment. Separate from the virtualized infrastructure, the colocation environment provides an interim step in the transition from an agency-owned equipment model to the economically viable PDC hybrid cloud architecture. Agencies that utilize the PDC's colocation environment have access to secure rack space that includes redundant electrical power with power protection, and redundant network connectivity that places the agency's equipment logically behind their firewall and security measures.

Proposed Projects

- Outreach to state agency partners with information on the benefits of the PDC offerings
- Expand the colocation environment within the PDC to accommodate growth
- Leverage the ADC for supplementary data center services

Benefits to the State

- Maximizes the investments already made by the agencies for data processing equipment
- Improves physical, security, and environmental conditions over many state office buildings for operating mission-critical applications
- Improves proximity to core enterprise compute, network, and storage resources to aid in the transition to a shared services business model
- Improves coprocessing, high availability solution for running mission-critical applications

GEOGRAPHIC INFORMATION SYSTEMS INFRASTRUCTURE

Description

The Mississippi Geospatial Clearinghouse (MGC) provides access to a comprehensive spatial information warehouse of the Geographic Information Systems (GIS) resources of Mississippi. This warehouse was developed for use by state and local governments, academia, and the private sector. The goal of the MGC, www.gis.ms.gov, is to make the application of spatial information technologies within the State more efficient by reducing the duplication of spatial data production and enhancing distribution through effective cooperation, standardization, communication, and coordination. ITS continues to work with the Mississippi Coordinating Council for Remote Sensing and GIS in the enhancement of the MGC.

Services Provided

- Physical facilities, computing power, and data storage capacity to support agencies' GIS applications
- Express Product Lists (EPLs) for GIS hardware and software for the acquisition and implementation of systems software products requested by state agencies
- Contract services to provide GIS application and database design and hosting
- GIS web map services
- GIS data and application backup and recovery

Proposed Projects

- Host and support of GIS efforts for the MGC and for agency developed GIS applications
- Reduce the direct cost of the GIS Clearinghouse through continued use of contracted services

Benefits to the State

- Integration of GIS technology into business processes
- Cost-sharing for implementing the hardware, software, and technical staff to support the complex architecture that produces long-term savings with economies of scale
- Scalable, stable, readily available, and highly secure environment for application systems
- Existing backup and recovery procedures plus annual testing of disaster recovery procedures
- Mature systems management facilities
- Secure, resilient, and highly available physical environment

ENTERPRISE MESSAGING SERVICES

Description

- Enterprise Messaging Services (EMS) is comprised of the following:
  - Email Relay Services is the delivery and receipt of electronic messages between state entities and across the Internet. ITS provides an infrastructure composed of hardware and software that can provide secure and filtered messaging services across the State infrastructure
  - Microsoft Exchange/Office 365 is the State's preferred hosted email solution and is provided under the State contract as part of the Office 365 Suite. The cloud messaging solution provides email, calendaring, shared folders, electronic archive, mobile device connectivity, mailing lists, and other features on a secure, highly available platform within the Microsoft Office 365 environment
  - Internal fallback relay queues mail for unreachable servers
  - Emergency internal mail relay server for interagency and outbound

Services Provided

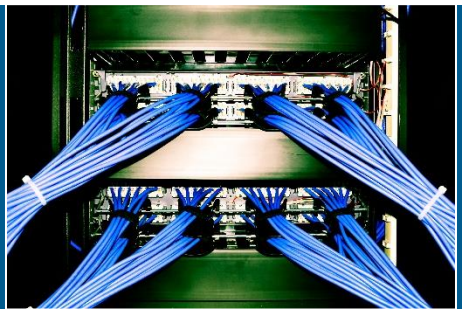
- Microsoft Certified Active Directory Infrastructure
- Relaying of mail via SSL/TLS encryption protocol
- Virus scanning of all inbound, outbound, and intrastate email
- SPAM filtering of all inbound email
- Mailbox hosting through Office 365 cloud solution

Proposed Projects

- Consolidate directory services into a statewide offering for state government agencies
- Implement a cloud-based email filtering solution

Benefits to the State

- Up-to-date patching, versioning, and upgrades
- 24x365 operation with after-hours on-call technical support
- Redundant servers
- Secure environment
- Backup and recovery efficiencies



Communications Domain

STATEWIDE VOICE NETWORK

Description

Statewide voice communications are provided for state entities and local governing authorities within the Capitol Complex, the Greater Jackson Metropolitan Area, and across the state through a variety of communications services. Currently, the State operates under a legacy long-term contract to provide traditional telecommunications services. These services are available statewide and include local and long-distance calling, Private Branch Exchange (PBX) trunking, business line, and Centrex type features serving many small, rural agency offices throughout Mississippi. In 2018, the State signed a new contract with a regional service provider for a new enterprise Hosted Voice over Internet Protocol (HVoIP) solution to provide the opportunity for modernization of the telephony infrastructure and to take advantage of current telecommunications technology.

Voice communications in the Capitol Complex are provided through an enterprise-class Avaya Aura 7 Communications Manager system with remote gateway servers strategically located within the Capitol Complex and around the state. The IP-based system provides a robust, resilient, and feature-rich environment for local and long-distance calling. Agencies and locations that connect to the system include: Department of Agriculture and Commerce; Department of Environmental Quality; Department of Health; Department of Human Services; Department of Public Safety; Department of Transportation; Department of Wildlife, Fisheries, and Parks; the Education and Research Complex; the Gaming Commission; Secretary of State; Veterans' Home Purchase Board; the Walter Sillers Building; the Woolfolk State Office Building; and others. Over 40 agencies have access to the system via the statewide area network.

Services Provided

- Local calling access through multiple service delivery solutions
- Local, intrastate, interstate, and international calling provided through the State's voice communications network
- Advanced Toll-Free calling capabilities to support agency business needs at a cost-effective rate

- Voicemail services to efficiently manage telephone messaging for state employees provided through either Memory Call service or the enterprise Aura Messaging system for customers located in the Capitol Complex
- On-demand assistance via call center applications to Capitol Complex customers for managing high call volumes while reducing operating and maintenance costs
- Various types of call center employee productivity reports for customers using the software application Centre-Vu Supervisor
- Hosted audio, web, video, and event conference calling at affordable contract rates
- VoIP capabilities to the agency's desktop across the State's voice communications platform, where cost-effective and technically feasible
- Detailed monthly pass-through billing designed to assist agencies with managing their telecommunications services through itemized call detail and inventory reporting at the individual user level

Proposed Projects

- Evaluate the impact of next-generation networking against legacy telecommunications infrastructure and pursue emerging technologies when cost-effective and feasible
- Continue controlled deployment of real-time IP-based services such as IP Video and VoIP technologies
- Expand Session Initiation Protocol (SIP) and Session Border Controllers (SBC) for SIP communication devices and local trunking access within the Capitol Complex telephone system
- Migrate remote office locations from legacy telecommunications technologies to hosted VoIP enterprise services
- Implement a centralized call recorder solution for agencies that have requirements for recording calls such as Call Centers
- Deploy SIP Endpoints outside of Capitol Complex

Benefits to the State

- Superior telecommunications services across the State built upon a manageable, cost-effective enterprise-class communications infrastructure
- Centralized management of all telecommunications services
- Consistent, reliable, and cost-effective statewide telecommunications services, statewide
- Web-based itemized monthly billing for managing agency usage and inventory of services
- 24x365 access to voice applications, services, and trouble reporting
- Reduced administrative cost by centralized ordering, trouble reporting, and billing processes
- Reduced technical costs by centralized deployment and management of shared telecommunications infrastructure
- Detailed audit processes to reduce vendor billing errors and to ensure the best possible rates for telecommunications services
- Accurate and comprehensive inventory of the State's telecommunications assets

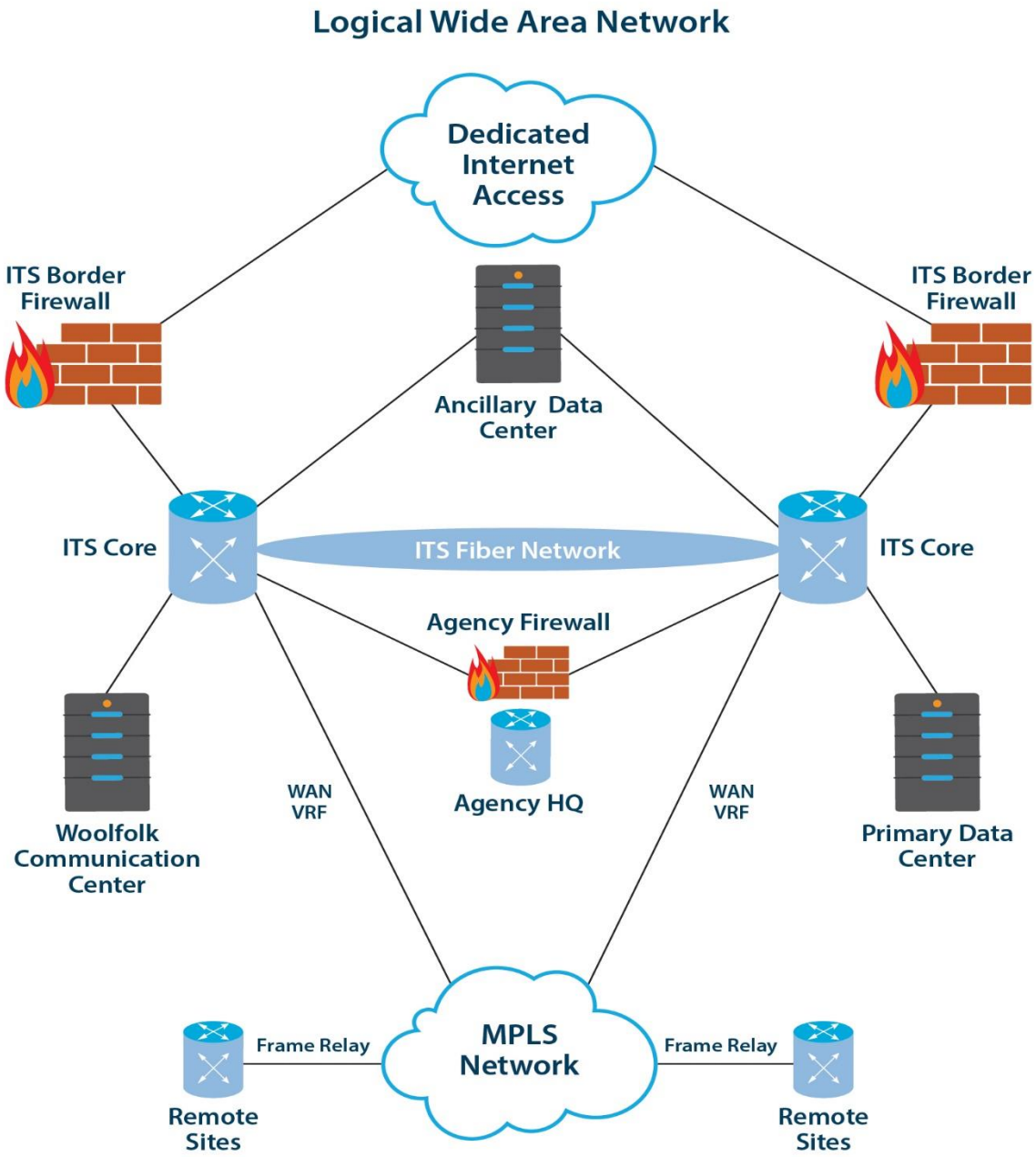
STATEWIDE DATA NETWORK

Description

Currently, the State's wide area network for data connectivity utilizes a technology known as Multi-Protocol Label Switching (MPLS) which facilitates a secure, redundant, high-performance wide area network architecture utilized by state government, universities, libraries, K-12 schools, and local governing authorities. The existing contract makes available the necessary products and services to facilitate the co-existence of all governmental entities on the network with multiple options for connectivity, performance, and quality of service. As part of the MPLS infrastructure, the State's telecommunication provider delivers firewall, intrusion prevention, and filtering services at the Internet access point to the State's network at no additional cost. These offerings allow agency partners with the flexibility to utilize these services, yet avoid the cost associated with purchasing these services and products at each site on the network.

Some of the current applications on the statewide network are:

- LAN/WAN interconnection
- High-speed data transfer
- Host-to-host data transfers
- Client/server applications
- TN3270 applications
- Statewide email
- Supercomputing access
- Remote systems management
- Intranet web-based applications
- Internet access, services, and web-based applications
- Voice over IP
- H.323 IP-based video
- GIS
- Telemedicine


Logical Wide Area Network
Dedicated Internet Access
ITS Border Firewall
ITS Border Firewall
Ancillary Data Center
ITS Core
ITS Fiber Network
ITS Core
Agency Firewall
Agency HQ
WAN VRF
WAN VRF
Woolfolk Communication Center
Primary Data Center
Frame Relay
MPLS Network
Frame Relay
Remote Sites
Remote Sites

METRO AREA FIBER NETWORK

Description

The Metro Area Fiber Network (MAN) supports high-speed data, voice, and video connectivity for all major state government buildings in the Capitol Complex, the E&R Complex, as well as buildings along the diverse fiber paths between the two fully redundant core network hubs. The infrastructure includes fiber connectivity within and between buildings plus the necessary routing and switching hardware. The resulting fiber network provides both redundant and resilient access to the State Data Centers (enterprise servers, eGovernment portal, and the statewide voice communications platform), the local and long-distance voice network, and the Internet by utilizing Virtual Switching System (VSS) architecture. The MAN is also a gateway to other agency sites statewide via the MPLS network.

Services Provided

- TCP/IP communications and addressing
- Border Gateway Protocol (BGP) carrier-class routing
- Virtual Route Forwarding (VRF) and private VLANs
- H.323 video services including firewall traversal
- Domain Name Services (DNS)
- 24x365 network monitoring, management, and reporting
- Session Initiated Protocol (SIP)
- Redundant and resilient Internet access and related services
- State-owned fiber connecting the following Mississippi government buildings/locations in the MAN via Ethernet (from 100 Mbps to 10 Gbps)
    - Department of Transportation (Headquarters and Lab Facility)
    - Walter Sillers Building
    - Department of Corrections
    - New Capitol
    - Woolfolk State Office Building
    - Governor's Mansion
    - Department of Human Services
    - Department of Health
    - Natural Science Museum
    - University of Mississippi Medical Center
    - Department of Public Safety
    - Department of Agriculture and Commerce (Agriculture and Forestry Museum)
    - Workers' Compensation Commission
    - Institutions of Higher Learning
    - Public Broadcasting
    - Library Commission
    - Department of Wildlife, Fisheries, and Parks
    - School for the Blind
    - School for the Deaf
    - Secretary of State (Heber Ladner Building)
    - Department of Education

- Department of Archives and History
- Department of Agriculture and Commerce (Headquarters)
- Public Employees' Retirement System
- Ethics Commission
- Robert E. Lee Building
- Robert G. Clark, Jr. Building
- Department of Environmental Quality (Amite Street, North State Street)
- 660 North Street
- 620 North Street
- ITS Office and Primary Data Center

Proposed Projects

- Work with partner agencies for the migration of agency applications and resources into the PDC
- Work with partner agencies to build high-availability solutions between agency locations and the PDC, and between the PDC and the ADC
- Replace the legacy 7613 core routers that handle all core routing functions within the PDC with higher performance, fully redundant carrier-class ASR 9904 routers
- Replace the legacy 7000 series switches with 10 Gbps capacity with Application Centric Infrastructure (ACI) providing 100 Gbps capable Software Defined Networking (SDN) functionality and allow ITS to respond faster to customer data center networking needs
- Implement high-speed, fully redundant, and resilient connectivity to the new hybrid cloud solution in the PDC
- Work with partner agencies to facilitate the migration of their applications to the new hybrid cloud solution in the PDC
- Work with partner agencies to implement high-speed and fault-tolerant connectivity to public cloud offerings to support agency applications

Benefits to the State

- Access to an enterprise-class, high bandwidth, fully redundant and resilient, multi-protocol network connected to any state resource
- Access to a secure managed network which takes advantage of the technology investment implemented within the MAN
- Lower overall costs as a result of the economies of scale of a shared infrastructure
- Expand functionality to facilitate disaster recovery and coprocessing of information and services

MISSISSIPPI RESEARCH NETWORK

Description

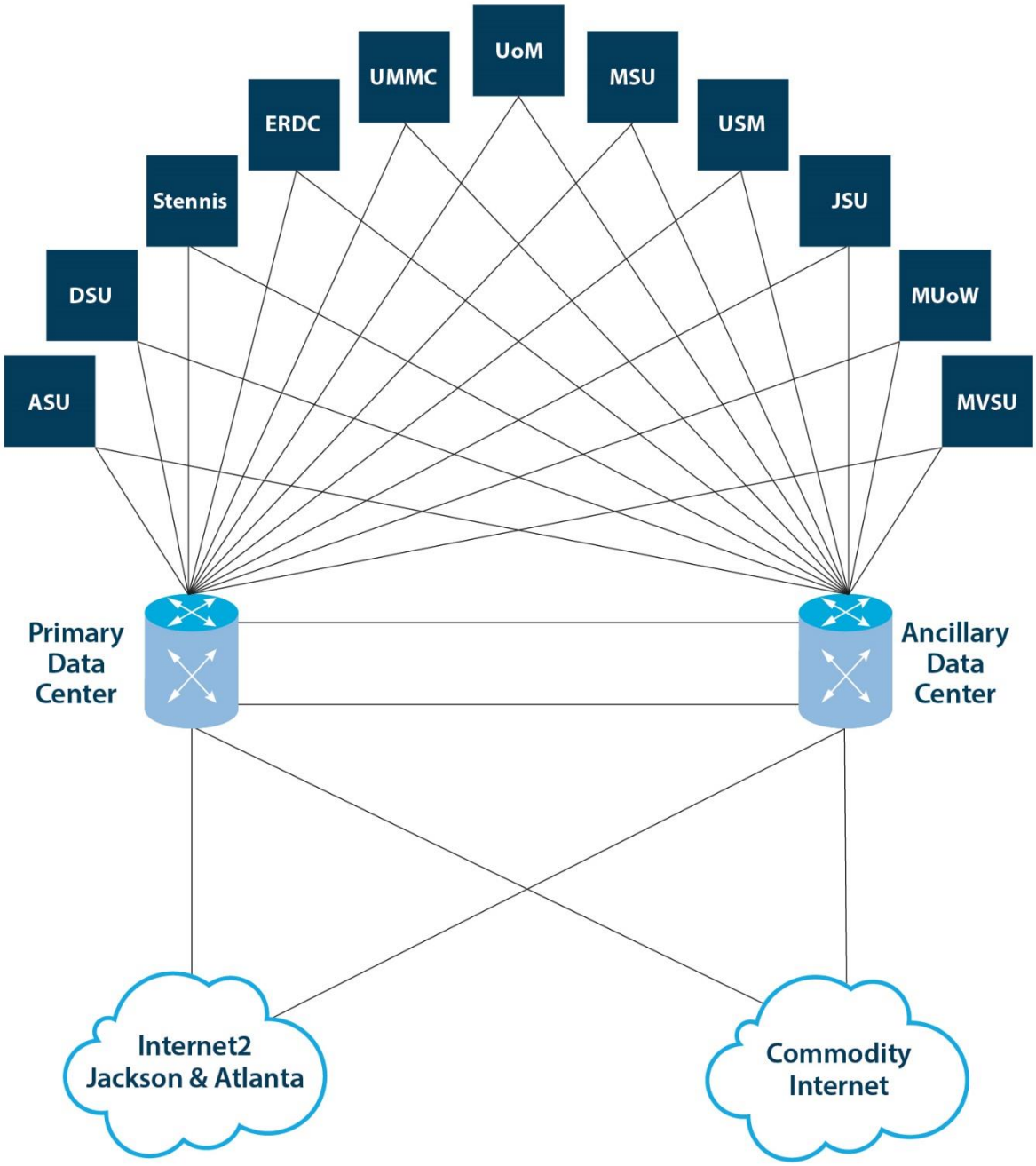
The Mississippi Research Consortium's (MRC) purpose is to develop and sustain nationally competitive research programs in the State of Mississippi. Formed in 1986, the MRC includes Mississippi's four research universities: Jackson State University, Mississippi State University, the University of Mississippi, and the University of Southern Mississippi. The organization has received recognition from the National Science Foundation and others and has been cited as a national model for how to best form a state science and technology infrastructure. The primary goals of the MRC are to:

- Develop a research infrastructure to support education and extend technology development in Mississippi
- Foster research funding opportunities and increase interaction with federal agencies
- Develop and share resources to improve science education opportunities for students elementary through college students
- Enhance economic opportunities for the State of Mississippi

During the 2010 Legislative Session, the Mississippi Legislature established a robust and resilient research network as part of Senate Bill 3184. This legislation authorized the design and implementation of a statewide, high capacity network that specifically fulfilled the needs of the State's research institutions. The research network is called the Mississippi Optical Network (MissiON) and provides the infrastructure to foster new educational opportunities and to keep Mississippi's research universities nationally competitive among peer institutions. The research universities extended MissiON to other possible research entities including the Stennis Space Center, the University of Mississippi Medical Center, and the Engineering Research and Development Center at the US Army Corps of Engineers in Vicksburg, MS. The research network design allows peering with other national research networks such as Internet2, Louisiana Optical Network (LONI), and National LambdaRail (NLR).

In 2017, the State signed a new provider contract as part of the new State Master Contract (RFP 5000) to build the next-generation MissiON network which greatly increased bandwidth capabilities and provided the inclusion of the regional universities into the MissiON network. Completed in 2018, the new MissiON network provides the capability for greatly increased bandwidth up to 100 Gbps for the existing research university members while also connecting the regional universities to include: Mississippi Valley State University, Mississippi University for Women, Alcorn State University, and Delta State University. Additionally, the MissiON network connections to Internet2 increased to redundant 100 Gbps circuits, with geographically diverse connector nodes located in Jackson, MS and Atlanta, GA.

Research Network Diagram



Benefits to the State

- Increases capacity for the research universities from 10 Gbps up to 100 Gbps
- Increases capacity for the regional universities from 1 Gbps up to 100 Gbps
- Provides Internet2 network redundancy from the research entities
- Provides flexibility for changes in Internet2 providers
- Allows for collaboration between the research universities and other State Network participants to include: K-12, community colleges, libraries, and state agencies
- Provides opportunities for disaster recovery capabilities between entities
- Allows the State to use university volumes when negotiating future contracts
- Helps research universities compete nationally for research grants and funds
- Helps promote economic development both regionally and statewide
- Improves collaboration and the statewide sharing of IT resources
- Provides Mississippi students with educational and research opportunities they might not otherwise receive
- Helps recruit the best and brightest researchers to Mississippi
- Helps to expand telecommunications infrastructure and technology to all parts of Mississippi
- Provides the universities with access to low-cost commodity Internet without the need for additional circuits

INTERNET ACCESS

Description

Internet access is provided through the State's telecommunications contract. The contract includes options for dedicated access through Managed Internet Services (MIS) and cloud-based access through the MPLS network. The preferred option for a specific location depends on bandwidth, network design, application, and a variety of ancillary features available with both offerings.

The importance of a robust, diverse, and resilient Internet connection cannot be overstated since it impacts the delivery of educational content, on-line testing, public information access, e-commerce through the State's portal, and connectivity to other logical networks for collaboration. Access to the Internet for all state entities is currently provided over the dedicated MIS option which affords the state with redundant multi-Gbps routes from Jackson, MS to Atlanta, GA and as well as Jackson, MS to New Orleans, LA.

The current aggregate Internet capacity for the State is approximately 15 Gbps and continues to grow as new web-based applications and e-commerce needs are introduced on the network for the delivery of statewide services. To protect this vital Internet lifeline in the event of an attack, ITS utilizes a Distributed Denial of Service (DDoS) mitigation contract with the State's telecommunications provider.

Services Provided

Listed below are the services offered by the State's telecommunication contract associated with Internet access. State entities and local governing authorities can take advantage of these services to provide access to their Internet users, or they may elect to configure their own Internet application servers to meet their business needs. These services include:

- Email
- Internet mail relay, virus protection, and SPAM filtering
- Content filtering, management, and reporting
- Web services including www.ms.gov
- Domain Name Services (DNS)
- Integrates content delivery services (caching)
- Security services, including firewalls, authentication servers, VPN, and IPS

Proposed Projects

- Upgrade the State's overall Internet capacity to meet agency and institutional demands

Benefits to the State

- High-speed, dedicated access to the Internet (the limiting factor is normally the local access circuit)
- Highly scalable solution for all participants
- Low-cost solution based on economies of scale and volume purchasing from the vendor
- Security services (firewall, IPS, DDoS, and filtering) included with MPLS Internet access to the hot site
- Mail processing facilities to print, process, and mail important documents
- Internet access

Security Domain

INFRASTRUCTURE SECURITY

ITS administers the State of Mississippi Enterprise Security Program to provide coordinated oversight of the cybersecurity efforts across all state agencies, including cybersecurity systems, services, and development of policies, standards, and guidelines.

Primary Data Center Physical Facilities

- Security camera surveillance with activity monitoring and archive
- Card access control system with biometric scanners
- Secure rack space with agency combination lock control
- 24x365 on-site facility and grounds security officer protection

Enterprise Server Component

- Security access services that include Lightweight Directory Access Protocol (LDAP) server, network authentication service, and firewall technologies
- Cryptographic services that include a Secure Sockets Layer (SSL) and the integrated cryptographic service facility

eGovernment Infrastructure (State Portal)

- Transport Layer Security (TLS) encryption on mail relays
- Mississippi Interactive (MSI) – Hosting infrastructure, security, and coordination of services in a dedicated Demilitarized Zone (DMZ) with controlled access from the State Network and only VPN access from the Internet

Network Security

- Multiple perimeter and PDC firewalls used to assist in preventing unauthorized activity
- Multiple perimeter and PDC Intrusion Prevention Systems (IPS) to assist in detecting, reporting, and terminating unauthorized activity
- Virtual Private Network (VPN) connectivity for the implementation of IPSec Virtual Private Networks and qualified SSL clients to secure connectivity of third parties to state resources as well as remote access by state employees to the State Network

- Detection of security events using both behavioral and signature-based methods combined with monitoring and analysis of net flow
- Aggregation, correlation, and analysis of logs from enterprise assets for a real-time view of the Enterprise State Network security landscape
- Access control system that utilizes multi-factor authentication to enforce access and authentication policies for networking systems and components
- Traffic filter that monitors network access across all ports and protocols for rogue activity and blocks infected internal endpoints from accessing malware command and control hosts
- Advanced malware protection that utilizes intelligence, known file signatures, and dynamic file analysis technology to block known malware, policy-violating file types, and communications trying to infiltrate the network
- Security intelligence that monitors traffic based on static and dynamic intelligence sources and blocks traffic, as necessary, based on reputation
- Domain Name Service (DNS) based filtering that leverages threat intelligence to assist with identifying and blocking access to websites known to harbor malicious software and other cybersecurity threats
- Access control list at the switch and router level to protect agencies by stopping the propagation of worms, viruses, and other threats
- Guest wireless network that offers Internet access for third parties that are not permitted access to State Network resources

ENTERPRISE SECURITY PROGRAM

- Monitor network and maintain historical statistics
- Manage and support SSL, cryptographic services, and digital signatures
- Align enterprise security policies, standards, plans, and other cybersecurity documents with current security methodologies and industry standards
- Utilize current cybersecurity methodologies and industry standards in the development of enterprise strategic objectives and initiatives
- Collaborate with state agencies and external entities regarding interoperable, scalable, cost-efficient enterprise cybersecurity services and technologies
- Disseminate persistent and regular cybersecurity threat and vulnerability information
- Coordinate regular Security Council Meetings with agency Information Security Officers
- Maintain ongoing operational responsibilities for enterprise core and perimeter defense solutions
- Analyze new enterprise security solutions for the Enterprise State Network
- Analyze new security solutions for the State Data Centers
- Participate in designing, planning, and implementing enterprise projects to ensure industry standards for cybersecurity are implemented
- Perform, coordinate, and promote security education and awareness
- Manage the enterprise security awareness and education training solution
- Manage enterprise security monitoring and event correlation tools and leverage internal/external partners for the identification of security incidents
- Distribute detailed notification alerts of detected security incidents
- Promote and coordinate cybersecurity exercises

Proposed Projects

- Complete a revision of the State of MS Enterprise Security Policy (ESP) that is aligned with the National Institute of Standards and Technology (NIST) Cybersecurity Framework and the Center for Internet Security (CIS) Controls
- Award an RFP for the acquisition of managed security services to assist with identifying, measuring, and prioritizing the potential risks that exist on State IT assets
- Replace ITS' hosted VPN solution with the new enterprise virtual private network (VPN) solution
- Research cloud security solutions and services
- Implement an enterprise architecture joining cloud infrastructure to the Enterprise State Network without introducing undue risk
- Research the cybersecurity insurance market for available coverage to mitigate losses from a variety of cyber incidents
- Provide managed security services to assist with evaluating and researching threats and prioritizing alerts and response recommendations based on risk
- Provide managed security services to assist with the monitoring and analysis of cybersecurity incidents
- Develop an RFP for the acquisition and implementation of an enterprise perimeter defense solution to enhance the ability to protect state assets

Benefits to the State

- Development of a risk-aware culture for investing in effective and efficient cybersecurity strategies, solutions, and resources capable of reducing the evolving data threat
- Management of enterprise security program activities for providing an enterprise-wide approach to prepare for, respond to, and reduce cybersecurity risks
- Management of enterprise core and perimeter cybersecurity solutions for protecting the Enterprise State Network and gaining situational awareness

INFRASTRUCTURE ADMINISTRATION

Description

An infrastructure that is as sophisticated as the State of Mississippi requires a level of administration that is responsive, efficient, and effective. With much of the business of the State becoming increasingly dependent on the eGovernment platform, Metro Area Fiber Network, and statewide networks, it is imperative that the business is supported by timely and well-conceived plans for administering, monitoring, and managing the components.

The function of network management is carried out by a group of trained network technicians located in the Primary Data Center. Network support is a 24x365 operation that provides help desk support, technical troubleshooting, network performance monitoring and tuning, coordination of new site installations, and planning for major network expansions and technology migrations.

Currently, several larger agencies provide Level-1 support for their applications and networks with ITS providing Level-2 support. ITS provides Level-1 and Level-2 for all other agencies. Level-1 support is troubleshooting problems that are common, easily addressed, and have procedures in place for resolution. Level-2 support is for those problems that are uncommon, complex, and often require a higher level of expertise.

Services Provided

- Monitoring of all the components of the infrastructure
- Collection and distribution of performance and usage data for all components
- Collection of data for capacity planning and/or IT systems design
- Bill management
- 24x365 operation with after-hours on-call technical support

Proposed Projects

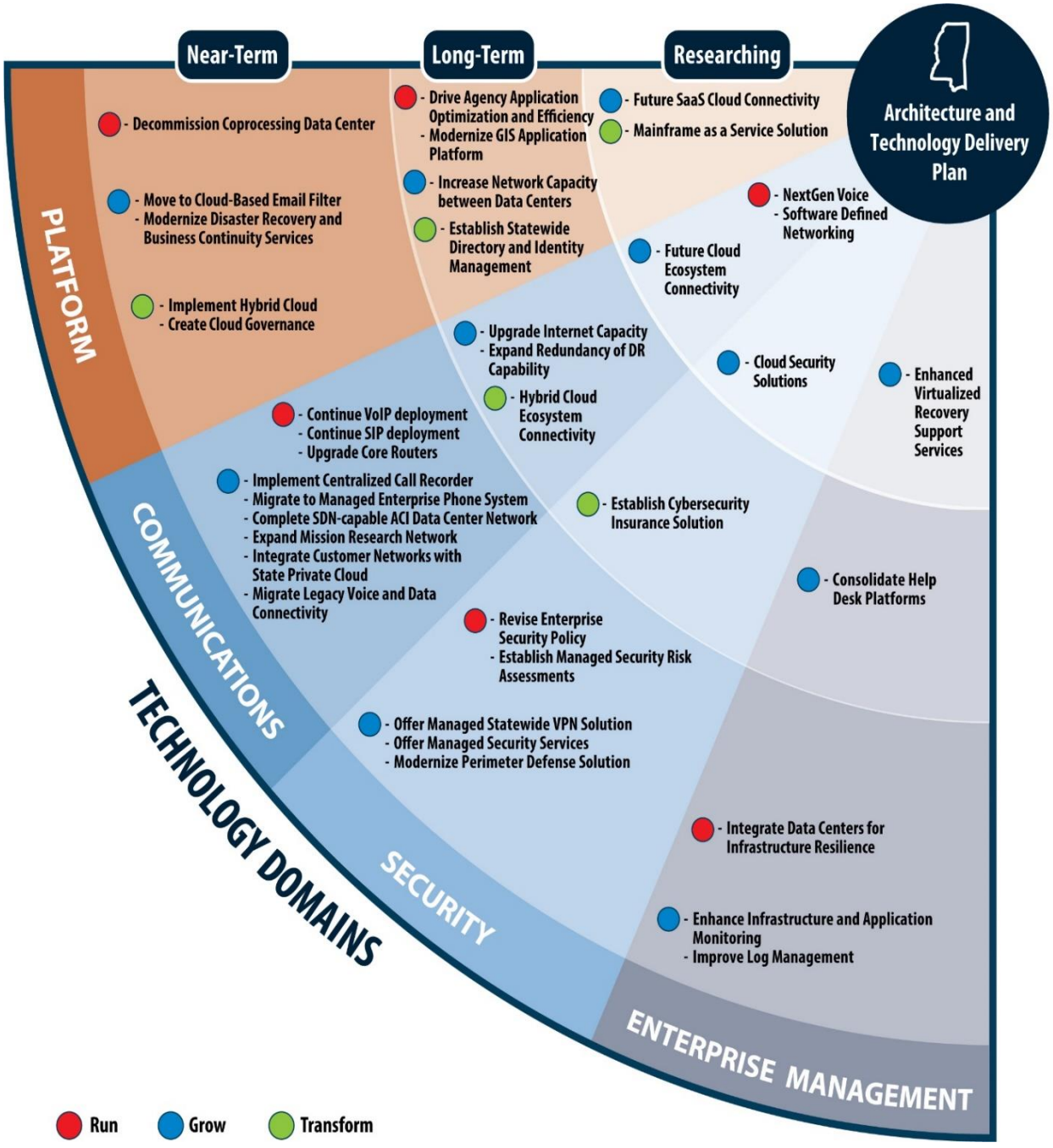
- Implement the architecture to utilize the ADC for enhanced backup and recovery services for core IT infrastructure
- Integrate the telecommunication system and the new service desk
- Enhance monitoring capabilities and user interfaces
- Enhancements to log management solution through third-party monitoring application
- Expand existing business recovery services contract to:
    - Support enterprise server recovery
    - Update configuration and modify equipment on contract as needed for recovering additional applications and virtual infrastructure; add individual agency infrastructure environments requested by customer agencies; add the virtual tape system; and enhance virtualization recovery support features

Benefits to the State

- Support for all infrastructure services
- Access to performance, capacity, and billing data as needed
- Secure environment
- Controlled test and production environments
- Extensive disaster recovery services

- Annually tested disaster recovery plans
- Periodically updated disaster recovery procedures which include new platforms and applications
- Restoration of data processing for the agency applications utilizing backup and recovery services at the PDC in 48-96 hours should a localized disaster occur

Summary of Proposed Projects



Technical Research and Future Projects

ITS focuses on emerging technology initiatives by researching, testing, assessing, and recommending new technologies. This effort concerning emerging technology is used to improve the architecture and implementation of technologies across the entire shared technology infrastructure, both by direct implementation and by influencing design decisions of the supporting infrastructure. As the effort progresses, it expands into a collaboration between ITS, state agencies, and institutions.

INFRASTRUCTURE INITIATIVE RESEARCH

The following topics are being as potential enterprise initiatives and may become projects implemented at the enterprise layer:

- Correlated Log Management
- Identity & Access Management
- Secure Web Gateway
- Software Defined Networking

TECHNICAL RESEARCH

The following topics are being researched by ITS for either specific non-enterprise applications or an understanding of the technology's implications to the enterprise infrastructure:

- Alternative Network Access
- Augmented Reality
- Big Data Analytics
- Blockchain Technologies
- Machine Learning
- Mobile Device Management
- Unified Communications and Collaboration
- Virtual Desktop Infrastructure

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